

Bachelor's, Master's, or Diploma Thesis

Unlabeled Data Handling in Federated Learning



Scope of work:

The "Translational Surgical Oncology" department at the National Center for Tumor Diseases (NCT) focuses on advancing computer- and robot-supported assistance systems for surgery, bridging the realms of computer science and medicine.

These systems heavily depend on intricate machine learning pipelines comprised of multiple models, each trained on extensive datasets. However, stringent data regularization laws in the medical domain severely restrict data sharing, compounded by the fact that not all available data is annotated. Consequently, the imperative lies in exploring methods to effectively incorporate unlabeled data into Federated Learning frameworks.

Goal of the work:

This research aims to compare promising Federated Learning approaches, such as Transfer Learning, Semi-Supervised Learning, or Self-Supervised Learning, to incorporate unlabeled data into the training process. The analysis seeks to identify the strengths and weaknesses of these approaches in the surgical domain.

We are looking for:

Motivated students with an interest in interdisciplinary work in AI-based computer- and robot-assisted surgery. Applicants should demonstrate commitment, teamwork skills, and a passion for contributing innovative ideas. An intermediate level in Python and PyTorch is required.



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getragen von:
Deutsches Krebsforschungszentrum
Universitätsklinikum Carl Gustav Carus Dresden
Medizinische Fakultät Carl Gustav Carus, TU Dresden
Helmholtz-Zentrum Dresden-Rossendorf

Contact:

Dipl.-Ing. Max Kirchner
max.kirchner@nct-dresden.de

<https://www.nct-dresden.de/tso.html>